

DAF ELECTRIC TRUCKS



Amy Carter – EV Operations Manager

ZERO EMISSION MARKET DRIVERS



EU Regulations

2025: 15% CO₂ reduction

2030: 45% CO₂ reduction

2040: Ban on sale of fossil fuel powered vehicles

City Bans - UK & Europe

- 40 cities by 2025
- 260 cities by 2030
- All cities by 2040

Forward Ambitions

- 'Cities ZE in 2030'
- '50% Transport ZE 2030,2035'
- 'Zero Emission by 2040'

HGV MARKET INNOVATION – ALTERNATIVES TO DIESEL

Alternatives to Diesel:

- Hydrotreated Vegetable Oil (HVO)
- Liquid Natural Gas (LNG) / Compressed Natural Gas (CNG) / Biomethane
- Plug-In Hybrid Electric
- E-Fuels
- Hydrogen Fuel Cell
- Hydrogen Internal Combustion Engine
- Catenary
- Battery Electric

HVO

Challenges:

- HVO fuels produces up to 90% less CO2 compared to fossil diesel
- Can be expensive and hard to source in large volumes
- Approved as a “drop in” replacement by most truck manufacturers
- Waste derived HVO is the cleanest as it does not utilise any crops used for food.
- Cannot be considered zero emission but is a “stepping stone” to net zero



LNG / CNG / BIOMETHANE

Challenges:

- LNG requires a complex cryogenic storage system to keep it at -160 degrees C
- CNG needs to be pressurized to approx. 250 bar (3,600psi)
- CNG is cheaper than LNG but is more difficult to transport to filling stations from production facilities
- Neither can be considered zero emission but are an effective “stepping stone” on the road to net zero



PHEV

Plug In Hybrid Electric Vehicle challenges:

- Very complex and expensive to build
- Two drivetrains means very heavy chassis
- Still retains a diesel engine but can use HVO / E Fuels
- Expensive maintenance due to complexity
- Cannot be considered zero emission



E FUELS

Challenges:

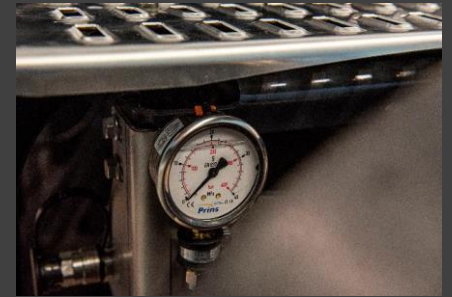
- Electrofuels, also known as e-fuels (synthetic fuels)
- Drop-in replacement fuel like HVO.
- Manufactured using captured carbon dioxide or carbon monoxide, together with hydrogen obtained from sustainable electricity sources such as wind, solar and nuclear power
- Cost per litre currently above £3 per litre
- Not considered zero emission and due to cost not currently viable for trucks



HYDROGEN FUEL CELL



HYDROGEN ICE



CATENARY

The concept:

- Catenary cables above major roads in the UK and trucks installed with pantographs. Trucks are constantly powered, and range is no longer a factor
- The Centre for Sustainable Road Freight estimates the cost at £19.3 billion to construct, but it noted that electrifying the UK road network would cover 65% of the distance travelled by HGVs.
- Already popular with buses and trams in UK & Europe



OUR BATTERY ELECTRIC JOURNEY



Leyland Terrier – 1980



LF Electric – 2021



XD/XF Tractor unit – 2023



CF Electric – 2018



XD/XF Rigid – 2023



LF Electric Phase 3 – 2023/4

BEV - XD ELECTRIC



200 - 500 km *



Available HV Batteries
from 210 to 525 kWh



Performance ratings from
170 to 270 kW



DC 150 kW (standard)
AC 22 kW (optional with DC 150 kW)
DC 350 kW (optional) AC 22 kW not available



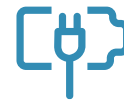
28 t (solo application)
GVM allowance of 2.000 kg

* Range is dependent on multiple factors and should only be used as a guide

BEV - XD ELECTRIC



150 - 400 km *



Available HV Batteries
from 315 to 525 kWh



Performance ratings from
270 to 350 kW



DC 150 kW (standard)
AC 22 kW (optional with DC 150 kW)
DC 350 kW (optional) AC 22 kW not available



42 – 50 t
GVM allowance of 2.000 kg

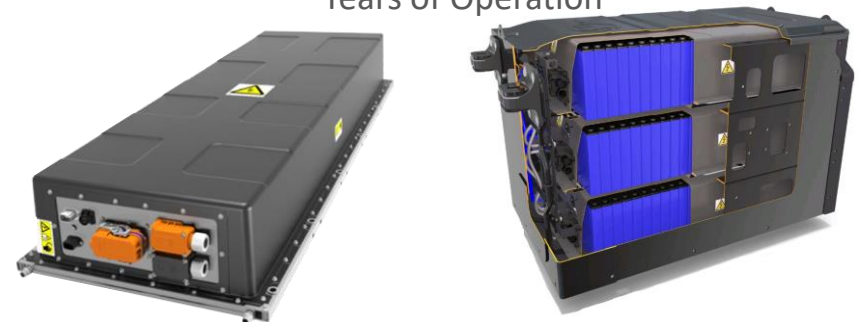
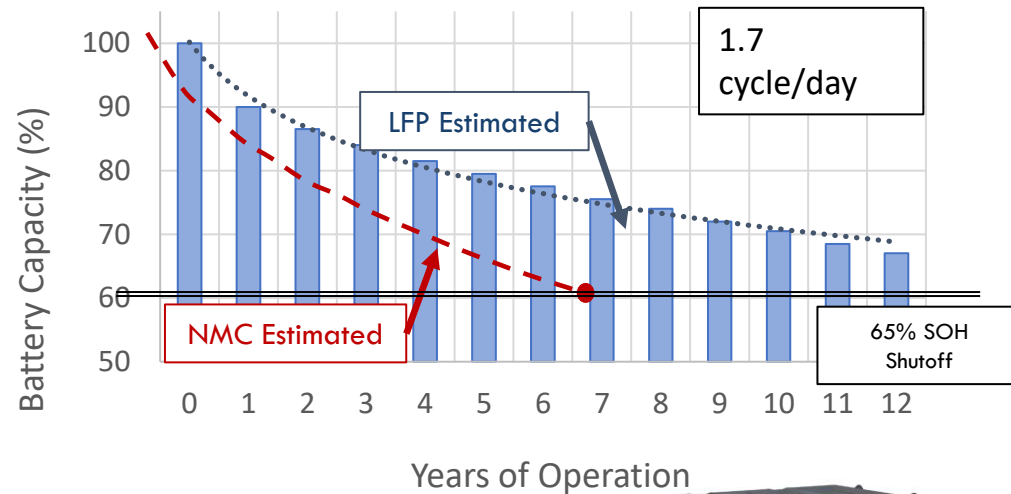
* Range is dependent on multiple factors and should only be used as a guide

ENERGY STORAGE SYSTEMS

LFP Advantages:

- All DAF EV's use Lithium Ferro Phosphate
- Contain NO Cobalt or Nickel
- Safest battery chemistry
(highly resistant to thermal runaway)
- Maintains high performance longer than Nickel Manganese Cobalt (Lithium-Ion) battery chemistries
- Less energy dense than NMC meaning batteries are slightly larger to provide equal energy

Battery Capacity Retention Estimation



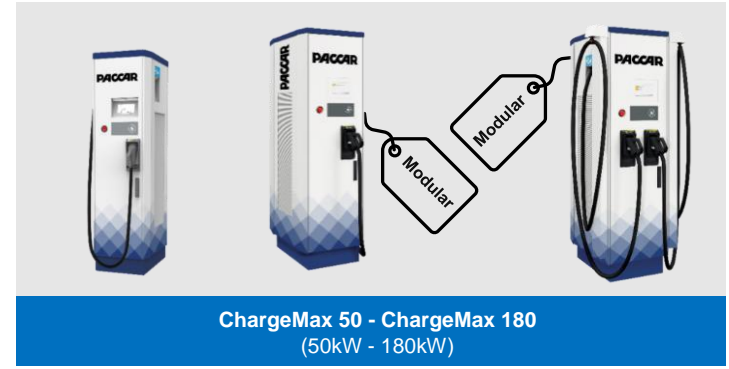
PACCAR CHARGER RANGE



PacCharge AC20
(7, 11, 22kW)



PacMobile 20 – PacMobile 40X
(24kW – 40kW)



ChargeMax 50 - ChargeMax 180
(50kW - 180kW)



PowerChoice 150X - PowerChoice 360X
(150kW - 360kW)



WHAT DOES THE FUTURE LOOK LIKE

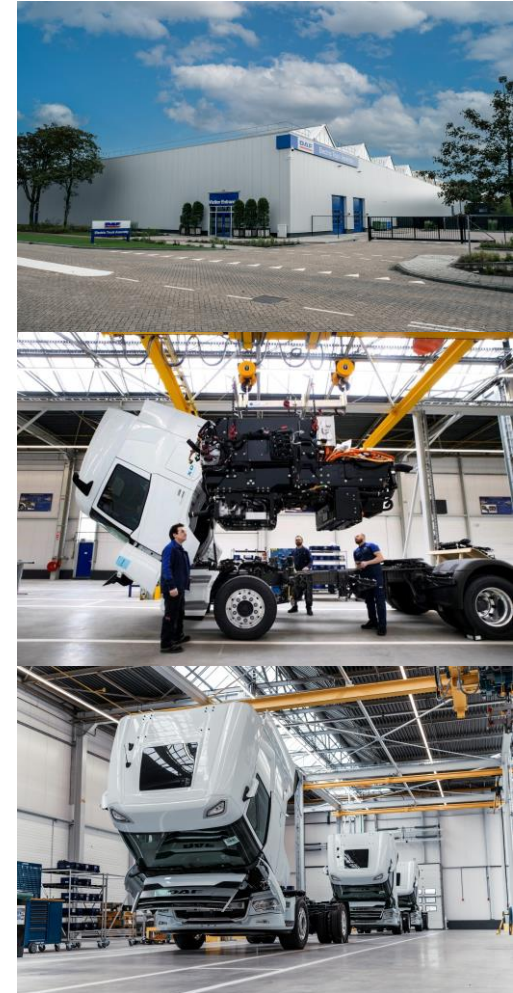
- Project Rapid
- ZERFD
- Battery technology
- Green Hydrogen production upscaled as oil production declines
- Housing transitioning away from natural gas boilers to heat pumps
- Storage batteries and solar panels to make UK homes energy efficient
- V2G (Vehicle To Grid) allowing EV's to put power back into the grid while on charge if not being used
- Catenaries for major UK roads



HOW DAF ARE MOVING FORWARD

- Qualifying the Customer to ensure that the EV product is right for their application
- Working with bodybuilders to develop power systems and products that harmonise with the truck and work in the most efficient way
- Taking part in government trials to collect data and learn for the future
- Providing demo trucks from our dealer network so that customers can trial an EV before committing to make the switch
- Research and development with our suppliers to ensure innovation continues
- Working with our charger partners and EVSE installation partners to grow the network

#thisisourtime



OUR GROWING EV FAMILY IN THE UK & EUROPE



THANK YOU FOR LISTENING

